

### **Remarks**

The abstract and the specification have been amended to correct editorial errors. No new matter has been added.

Claims 1-5 were pending in the application. In the Office Action, claims 4 and 5 are withdrawn from further consideration by the Examiner as being drawn to non-elected inventions, claims 1-3 are rejected. In the instant Amendment, claims 4 and 5 have been canceled, without prejudice, and claims 1-3 have been amended. Upon entry of the instant Amendment, claims 1-3 will be pending in the application.

Claim 1 has been amended to recite that the annealing and plating are carried out in an all radiant tube type annealing furnace without an oxidizing zone. Support for amended claim 1 is found at paragraphs [0009]-[0010], [0059]-[0060], and Fig. 1 of the published application. Claim 1 has also been amended to correct editorial errors, including the log of the water partial pressure and hydrogen partial pressure which should be represented by the formula:  $\log(\text{PH}_2\text{O}/\text{PH}_2)$ . Claims 2 and 3 have been amended to correct a grammatical error and to make the language clearer. No new matter has been added by these amendments.

### **Response to restriction requirement**

The Office has indicated that restriction to one of the following groups of claims is required under 35 U.S.C. § 121:

- I. Claims 1-3, drawn to a process of production of a high strength galvanized steel sheet;
- II. Claims 4, drawn to a manufacturing equipment of hot-dip galvanized steel sheet; and
- III. Claim 5, drawn to a system for production of a high strength galvanized steel sheet.

Applicants hereby affirm the election of the claims of Group I, *i.e.*, claims 1-3.

### **Claim rejection under 35 U.S.C. §103**

Claims 1-3 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP 2001-279412 ("JP '412") in view of U.S. Patent No. 4,437,905 to Nitto, et al. ("US '905") for the reasons set forth on pages 4-6 of the Office Action. Applicants respectfully traverse.

Claim 1 has been amended to recite that the annealing and plating of the claimed process are carried out in an all radiant tube type annealing furnace without an oxidizing zone. Claims 2 and 3 depend from claim 1, and therefore each includes the limitation of claim 1.

The present invention provides a process for production of a high strength galvanized steel sheet, which comprises continuously hot-dip galvanized high strength steel sheet having a content of Si of 0.4 to 2.0 wt % by a hot-dip galvanized steel sheet production system using an all radiant tube type annealing furnace without an oxidizing zone. The present process controls the atmosphere of the reducing zone such that it will not cause iron to oxidize but causes internal oxidation of  $\text{SiO}_2$ . According to the specification, internal oxidation of  $\text{SiO}_2$  is a phenomenon which causes Si to oxidized in place, so the cause of the drop in plating adhesion, that is, the concentration of Si at the surface of the steel sheet can be prevented (*see* paragraph [0027] of the published application).

JP '412 teaches a high Si-containing high strength galvanized steel sheet having a good coating property and an excellent corrosion resistance and manufacturing method (*see* JP '412, Abstract). JP '412, however, does not teach using an all radiant tube type annealing furnace without an oxidizing zone in its manufacturing method for Si-containing galvanized high strength steel sheet. Instead, JP '412 teaches a production process using a facility equipped with both an oxidization zone and reducing furnace to generate Fe oxide in several thousand Å, then reducing it in the atmosphere with  $\text{N}_2$  gas containing 1-70% of  $\text{H}_2$  in the reducing zone in order to reduce Fe oxide and cause internal oxidation of  $\text{SiO}_2$  (*see* JP '412, Abstract, and paragraphs [0021] to [0023]). Therefore, JP '412 teaches a production process that is a different production process from the present invention.

US '905 teaches a process for continuously annealing a cold-rolled low carbon steel *strip*, where the steel strip is rapidly heated in an oxidizing zone with gaseous combustion prepared at a combustion air ratio of 0.8 or more but less than 1.0 in a direct fired furnace to cause the thickness of a layer of oxides on the surface of the steel strip not exceed 1000 Å, by maintaining the temperature in a reducing atmosphere comprising 4% or more of hydrogen and the balance nitrogen (*see* US '905, the abstract, and col. 3, ll. 39-49). Therefore, US '905 also teaches a process that uses both an oxidization zone and a reducing zone (via a direct fire furnace), which is different from the present invention which uses an all radiant tube furnace without an oxidization zone.

Therefore, both of the cited references disclose a process that uses an oxidizing zone to generate Fe oxide. None of the cited references discloses or suggests performing the process in all radiant tube type annealing furnace without an oxidizing zone. None of the cited references discloses or suggests a process that does not cause iron to oxidize. One skilled in the art would not have arrived at the process for a high strength galvanized steel sheet of the present

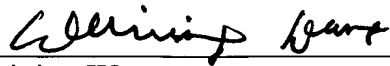
invention based on the disclosure of JP '412 and the disclosure of US '905. For at least these reasons, the rejection of claims 1-3 under 35 U.S.C. § 103(a) over JP '412 in view of US '905 cannot stand and should be withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the present application is in condition for allowance. Early and favorable action by the Examiner is earnestly solicited. If the Examiner believes that issues may be resolved by a telephone interview, the Examiner is invited to telephone the undersigned at the number below.

Respectfully Submitted,

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